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ABSTRACT

This core curriculum consists of materials for use in conducting a two-year secondary level agricultural education course. Addressed in the individual units of the guide are the following topics: leadership; agricultural career planning; supervised occupational experience programs (SOEPs); agricultural mechanics (shop management and safety, drawing and sketching, hand tools, hardware, basic carpentry and construction, hot and cold metal agricultural mechanics skills, arc welding, oxyacetylene welding, tractor and machinery operation, basic electricity, small gas engines, and careers in agricultural mechanics); animal science (selecting livestock, caring for and managing livestock, feeding animals, providing health care for animals, and raising livestock); special references for animal science; agricultural business; and plant science (plant growth and reproduction, basic soils, soil conservation and erosion control, field crop management, range management, basic horticulture, basic forestry, crop pest management, agricultural chemicals, and career opportunities in plant science). Each unit consists of lists of objectives and references. (MN)

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CORE CURRICULUM for Vocational Agriculture Education

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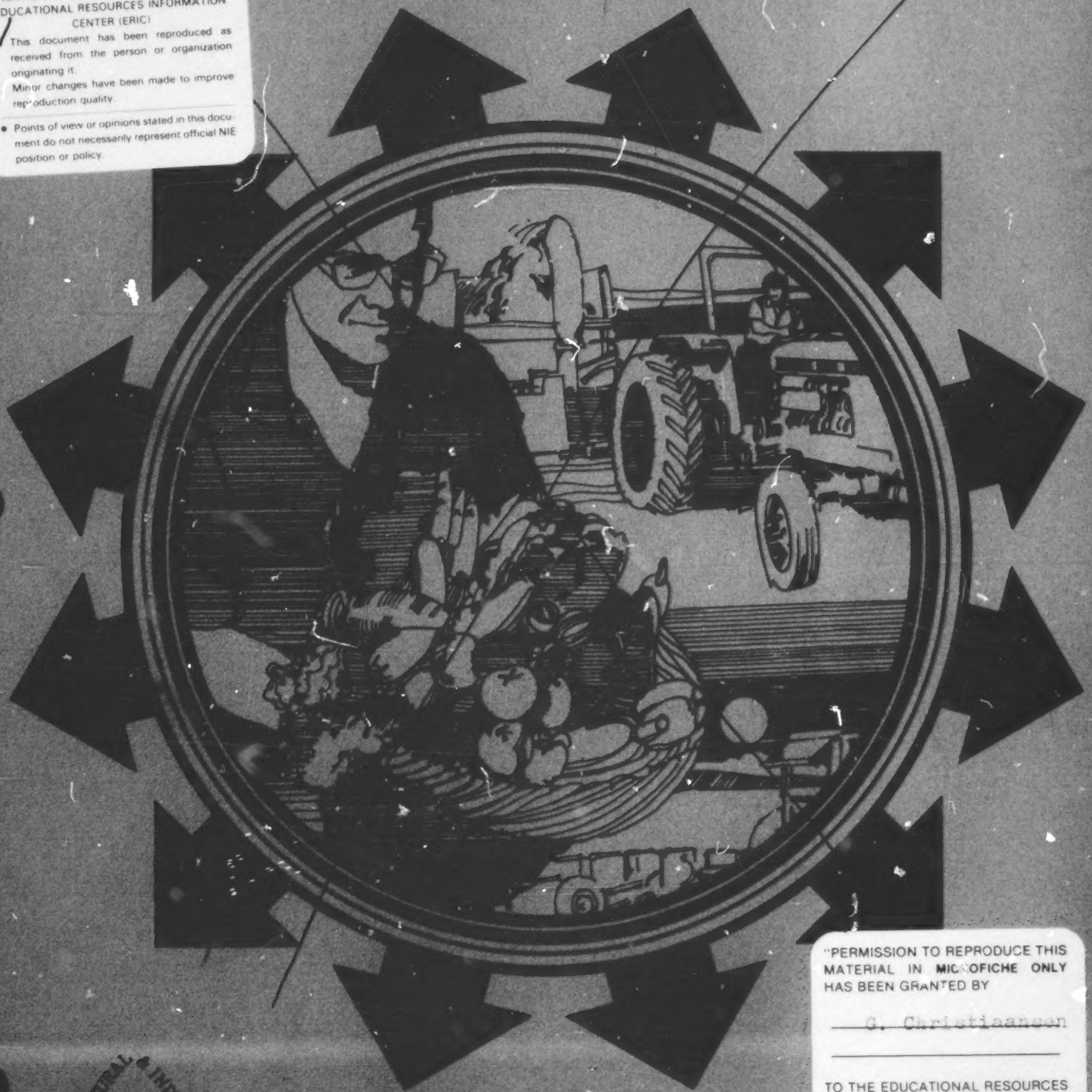

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Agricultural & Industrial Education, Montana State University, Bozeman

1983 - Revision

TWO YEAR CORE CURRICULUM

FOR

AGRICULTURAL EDUCATION

IN

MONTANA

Agricultural and Industrial Education Department

Montana State University

Bozeman, Montana 59715

Revised 1983

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TWO-YEAR CORE CURRICULUM FOR AGRICULTURAL EDUCATION IN MONTANA

Preface

Montana vocational agricultural educators have traditionally assessed their curriculum. This concern for the curriculum of the vocational agriculture program has prompted teachers, supervisory staff and teacher-educators to continually seek ways to assess "what is" and look for new "ways and means" to improve the educational activity and experiences now provided.

The first effort toward developing a competency based core curriculum began in 1971 with the initiation of the Montana Agricultural Manpower Research studies. The purpose of this research was to:

1. Assess the agricultural production and agribusiness job opportunities.
2. Define the agricultural production and agribusiness job titles.
3. Determine the competencies (knowledges, skills and attitudes) needed by persons employed in agricultural production and agribusiness.
4. Determine the several competencies unique and common to agricultural production and agribusiness.
5. Design and pilot a competency based instruction program in agricultural education at several educational levels.

Through the early involvement and commitment of representatives from among the Montana Vocational Agriculture Teacher's Association, the Helena office of the Superintendent of Public Instruction, and the Montana State University Department of Agricultural and Industrial Education, a series of agricultural employment studies were completed. The competencies that were extrapolated from this data formed the basis upon which the initial core curriculum was developed. This document is a revision of the original two-year core curriculum completed in 1975.

Since the initial agricultural employment studies were completed, the continued involvement of practitioners in the field to updating employment data and identify needed competencies to keep pace with agricultural technology has been continuous. The continual involvement of practitioners has contributed much to this effort to provide an updated Montana Two-Year Core Curriculum. It is hoped that the information contained in this document will be of assistance to teachers responsible for designing and implementing educational experiences related to the agricultural industry.

Acknowledgements

Appreciation is expressed to all those who, in some way, assisted in the development of this core curriculum. The contribution of time and talents toward the publication of this document was most helpful.

Appreciation is extended to all of the vocational agriculture teachers who have helped to review the material contained in this curriculum guide.

A special thanks is also extended to the staff of the Department of Vocational Education Services of the Montana office of the Superintendent of Public Instruction, Helena, for their monatory support and assistance throughout the revision process.

The Montana Model for Curriculum Development

A competency based instructional program based on known jobs and competencies in agriculture, is based on the idea that competencies needed by persons employed in agriculture will be taught within the school curriculum. Identified competencies which were to be used as a basis for curriculum development, were placed into three levels of learning difficulty as follows:

Level One Competencies	--	Taught in grades 9 - 10
Level Two Competencies	--	Taught in grades 11 - 12
Level Three Competencies	--	Taught in grades 12 - 14

If agricultural education in Montana were to meet the broadening needs, interests and goals of an expanded multi-faceted student clientele, it would be necessary to develop a coordinated instructional program in agriculture, beginning with the freshman year in the high school and continuing through the second year of post-secondary level training offered by either area vocational centers or community colleges.

As was mentioned, the first step in the development of a coordinated instructional program in agriculture was to identify those competencies which should be taught in every department of vocational agriculture in the state. The competencies and concepts taught in the "core" curriculum are common and applicable to specialized agricultural programs which would be offered during high school grades 11 - 12 or at the post-secondary level.

The core program was designed to serve as a basis for students who, upon completion of the core, would enroll in specialized grades 11 - 12 programs in primarily:

Agricultural Production
Agricultural Sales and Service
Agricultural Mechanization
Forestry
Horticulture

This curriculum guide contains only suggested units of instruction and teaching objectives for the first two years of instruction in vocational agriculture in Montana. We are hopeful this will serve as a guide for teachers, administrators, guidance counselors and local advisory council members in planning instructional programs to equip those students enrolled in the first two years of vocational agriculture with essential basic competencies required for the more specialized programs at the eleventh and twelfth year.

Figure 1 shown on page 4 portrays the curriculum development model for agricultural education in Montana.

Purpose and Use of the Guide for General Curriculum Development

The Montana Two-Year Core Curriculum Guide has been prepared to assist vocational teachers and administrators in secondary public schools to improve the quality of their educational program in agriculture.

The two-year core is only a framework for local curricula development and thus no attempt has been made to prescribe specific content and methodology for any given school. It is designed to give the teacher, advisor councils, and administrator the freedom and flexibility to develop innovative and unique beginning programs in agriculture, especially designed for the local community. The guide will be most useful in situations where a comprehensive curriculum development is being undertaken, a new vocational agricultural curriculum is being developed or an existing program is being examined with consideration given to revision.

For those contemplating developing a new program or making a major curriculum change, it will be helpful to review the steps in the total curriculum process.

MONTANA'S CURRICULUM MODEL

FOR THE

HIGH SCHOOL VOCATIONAL AGRICULTURAL PROGRAM

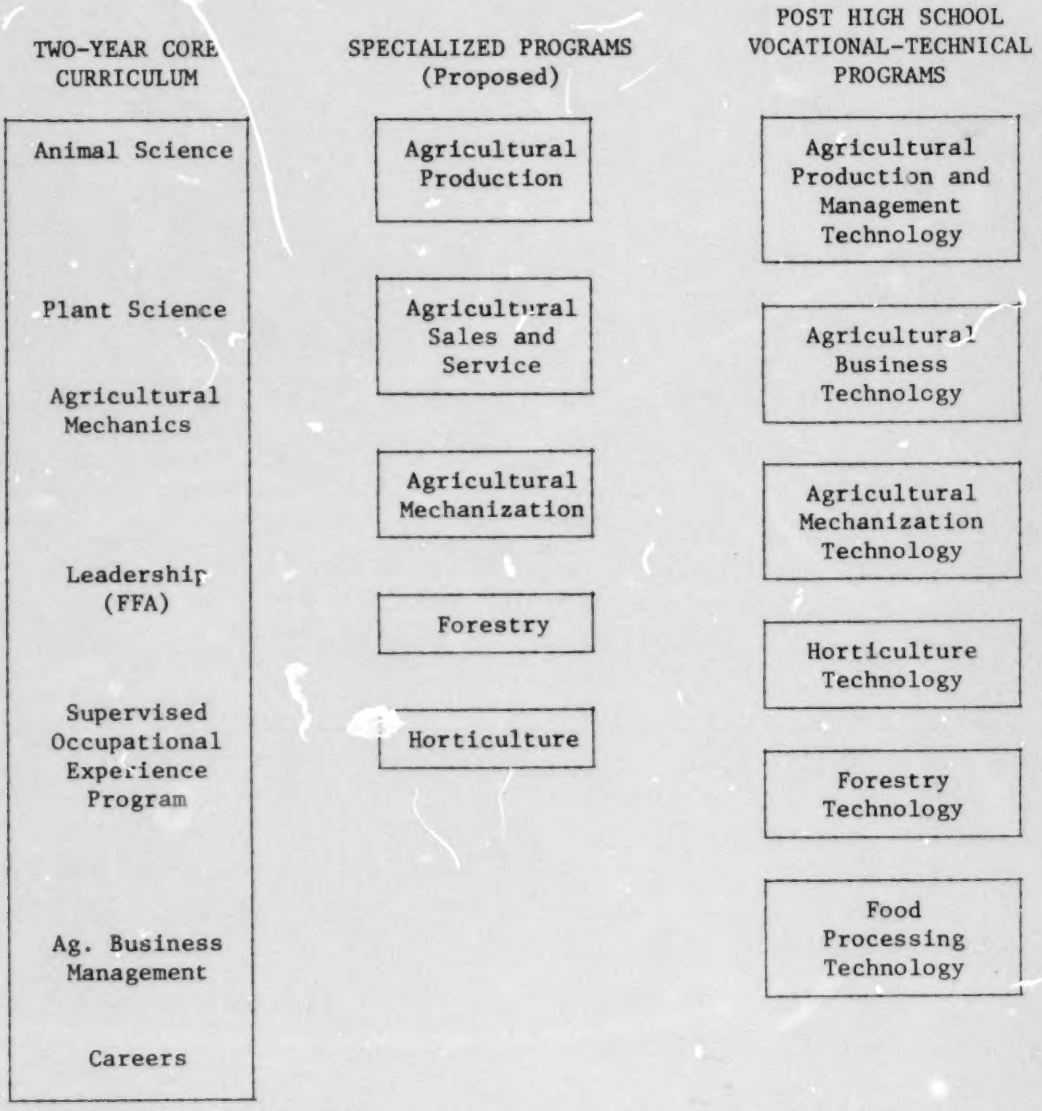

FIGURE I

Step I -- Establish the Basis for Vocational Agriculture in the Secondary School System:

The initial step in developing a vocational agriculture curriculum is to establish a sound basis for the total program. Simply stated, it involves establishing a need for the program, describing in detail how these needs can be met, and outlining the general goals of the program.

Generally speaking, Step I requires a study of the cultural, social, technological and occupational needs of the students in the community served by the school. Out of this study one should develop a description of the community, the school and the students to be served. One must remember the bounds of the community served may go beyond the local school district.

A philosophical statement or rationale for the vocational agricultural program should then be developed which describes the contribution that vocational agriculture can make in meeting the needs of students in the community. Careful attention should be given to the definition of the program, statement of purpose and the preparation of detailed goals for the program.

Step II -- Establish a Basis for Vocational Agriculture at the Various Grade Levels:

Having established the need for the program, Step II requires the curriculum planner to direct his/her attention towards the different groups within the program. Each of these groups, often categorized by grade level, differ in age, maturity, career aspirations, individual abilities and interests.

By identifying the needs of each group of students, one can develop a rationale that will serve as a basis for developing agricultural activities which will meet those needs. Activities can be developed which will provide student experiences similar to those required for workers in production agriculture or agri-business. A well-designed vocational agriculture program for the first two years of high school should provide exposure to a vast number of concepts and occupations.

This core provides a group of objectives from which vocational agriculture teachers may choose as they consider each level of student. Remember, the objectives selected should be consistent with the overall goals of the program.

Step III -- Outline the Vocational Agriculture Program:

At this point in the curriculum development process, the program (units or courses) to be offered at the various levels should be identified. These units or courses will need to be appropriate in scope and sequenced to create an effective learning situation.

Remember, units or courses should be selected based on the characteristics of the students within the particular grade level. It may not be possible to serve all students equally well when such things as class size, facilities and resources are taken into consideration.

A careful analysis of the agricultural occupations in which the students have expressed interest will help provide insight into the competencies needed by entry level workers. The curriculum developer must then identify those competencies which are consistent with the goals of the program and maturity level of the students.

Step IV -- Prepare Teaching Materials:

The preparation of individual teaching plans and supplemental material will be the responsibility of the individual teacher. It will be necessary for the individual teacher to select and organize the course content. Unit plans, unit aims and goals, lessons and lesson objectives should be developed. Further decisions will need to be made as to the texts and references to use, and the teaching strategies to employ.

Unit and lesson titles should be descriptive in nature. Performance objectives, statement of expected student outcomes, which include minimum accepted standards of performance should be prepared for all individual lessons based on competencies needed by future employees.

The development of teaching strategies will vary with the grade level, content being presented, student population and the teacher. The resources of the local community should be used whenever feasible.

Step V -- Evaluate Curriculum and Instructional Effectiveness:

The teacher, as a curriculum planner, should consider two methods of evaluation. Instructional effectiveness can be examined through process evaluation (procedures followed), while the overall curriculum should be measured against product evaluation (graduates) of the program.

Evaluation of instructional effectiveness should determine how well the vocational agriculture instructor has established his/her performance objectives and if the teaching techniques used and instructional material provided has enabled the student to meet the stated objectives. Innovative techniques should be incorporated into the traditional testing program to allow the students to display their mastery of the subject content. Process evaluation must be a continuous process.

Product evaluation should focus on measuring the outcomes of the program, placement and achievement and advancement on the job. How well a worker is able to perform in the regular world of work can be a valid indicator of the appropriateness of the curriculum.

Before undertaking any type of evaluation, the program director must carefully plan how the data will be gathered and from whom.

The Format of the Core Curriculum

The core curriculum is competency based. Competencies have been organized into clusters of knowledges, skills, and attitudes in various instructional areas that are deemed essential for all agriculture students regardless of their specific career choice. The cluster concept is based on the premise that many agricultural careers may be classified into related groups on the basis of identical or similar competencies required for successful entry level employment.

The cluster concept has several advantages for the vocational agriculture program and those students enrolled in the program. The concept gives the student a greater opportunity to:

1. Carefully appraise individual interests and abilities in a wide variety of agricultural careers.

2. See the relationships and commonalities that exist among a wide variety of agricultural careers.
3. Make a wise choice when making a career choice.
4. Learn competencies necessary for entry level employment in agriculture.
5. Develop transferrable competencies that will enable him/her to adapt to rapid technological change in agriculture.

Instructional Units

The core curriculum for the first two years of vocational agriculture includes suggested units of instruction developed from within seven instructional areas. The instructional areas include:

1. Plant Science
2. Animal Science
3. Agricultural Mechanics
4. Leadership
5. Agricultural Career Planning
6. Supervised Occupational Experience Programs (SOEP)
7. Agricultural Business Management

Each large instructional area is further divided into units of instruction which are intended to include teaching objectives developed from those competencies deemed necessary for all students in the first two years of the vocational agriculture program.

Performance or Behavioral Objectives

A well-stated performance objective should include three separate and identifiable elements: 1) conditions or givens, 2) behavior and, 3) standards or criteria. Generally speaking, the objectives given in the core include behavior only. This will allow greater flexibility for the local teacher when developing lesson plans in that conditions or givens under which the behavior is taught and standards or criteria expected may need to vary from community to community.

All objectives are clustered under an instructional unit. The objectives should be included in a series of lesson plans. Generally speaking, several lessons

will need to be developed in order to properly and effectively teach the stated objectives.

Selected References

A list of selected references (to be included in each instructional unit) is given following the objectives. The list of references is very limited and individual departments may have other references in their library that will work equally well or better in developing individual lesson plans.

Using the Guide as a Specific Planning Document

The success of a vocational agriculture teacher in the classroom depends on many factors, one of which is a well-planned curriculum. With today's agricultural technology advancing rapidly, it is very difficult to find sufficient time to provide all of the training that will be needed. Therefore, it puts a greater responsibility on each teacher in every local community where vocational agriculture is taught to provide quality instruction in a carefully selected range of instructional areas.

This core curriculum for the first two years of vocational agricultural instruction can be helpful to a teacher in selecting specific instructional content. The following suggestions are provided to illustrate how a teacher might use the guide to determine how much time to devote to each area of their program. The process is summarized in the example, "Yearly Unit-Time Outline." You will note that space has been provided on the sheet for you to plan your own program. After you have established the basis for your program at the various grade levels as suggested earlier, proceed as follows:

1. Determine the total number of days you have for instructional activity in the school year. Subtract out days for individual project work, days for review and tests, and a reasonable number of days for extra activities that you are not aware of at the beginning of the school year. Thus, you can estimate the number of days you have to devote to instruction. In the example given there are 143 days for which the teacher can plan teaching activities.

2. Next, determine the percentage of time you feel you should devote to each major area based on the needs of your local community. You should give some serious thought to the time breakdown. Remember, it is not necessarily what the students want but what they need that is important. In the example given, 40 percent (47 days) was set aside for Ag Mechanics. With the 20 days set aside for individual project work, this means that about 50 percent of the time will be devoted to Ag Mechanics activity. The major area time breakout is identified by the ** on the example.

3. Once the major time split between Ag. Mechanics and the rest of the program has been made, proceed to assign blocks of time to the major instructional units (see example).

4. Finally, assign the number of days you plan to devote to the specific instructional units. Before assigning these time blocks, carefully study the objectives as outlined under the respective units of instruction in the core. Because of the amount of material that could be covered, you will probably find that you may have to leave some content out or postpone it until the junior or senior year of the program.

It is suggested that as a teacher you review the Yearly Unit-Time Outline regularly. No doubt, shifts of time will have to be made throughout the course of the first two years of vocational agriculture. However, such a plan will serve as a valuable guide.

YEARLY UNIT-TIME OUTLINE

Example School: Bozeman Example Year: 1983-84

Local School: _____ School Year: _____

Major Areas	Instructional Units	Days Allotted Ag 1	**	Ag 2	**
LEADERSHIP		*15		*15	
	Introduction to the Vo-Ag Program	4			
	Leadership Through FFA	6		3	
	Leadership Development Through the Use of Parliamentary Procedure	5		6	
	Leadership Skills Development			6	
CAREERS		* 2		* 2	
	Agriculture Career Planning	2		2	
SOEP		*12		*12	
	The Role of the SOEP	3		1	
	Types of SOEP	5		2	
	Planning and Implementing SOEP	4		9	
AG. MECHANICS		*57		*57	
	Shop Management & Safety	5		2	
	Agricultural Mechanics Drawing & Sketching	10		2	
	Hand Tools in Agricultural Mechanics	10			
	Hardware in Agricultural Mechanics	5			
	Basic Carpentry & Construction	5		15	
	Basic Agricultural Mechanics Skills	5		10	
	Cold Metal in Agricultural Mechanics	5		5	
	Arc Welding in Agricultural Mechanics			5	
	Oxyacetylene Welding in Agricultural Mechanics			5	
	Tractor and Machinery Safety	10			
	Basic Electricity in Agricultural Mechanics			5	
	Small Gas Engines in Agricultural Mechanics			7	
	Careers in Agricultural Mechanics	2		1	

YEARLY UNIT-TIME OUTLINE (Continued)

Major Areas	Instructional Units	Days Allotted Ag 1	**	Ag 2	**
ANIMAL SCIENCE		*27		*27	
	Introduction to Animal Science	5			
	Selection of Livestock	5		2	
	Care & Management of Livestock	10		5	
	Selecting Livestock for Projects	5		2	
	General Animal Feeding			5	
	General Animal Health and Care			5	
	Approved Practices for Raising Livestock			8	
	Careers in Animal Science	2			
AGRICULTURAL BUSINESS		* 3		* 3	
	Agricultural Business	3		3	
PLANT SCIENCE		*27		*27	
	Plant Growth and Reproduction	7			
	Basic Soils	5		5	
	Soil Conservation and Erosion Control	3		2	
	Soil Fertility and Fertilizer			5	
	Field Crop Management	8		5	
	Range Management			5	
	Basic Horticulture	3			
	Basic Forestry				
	Agricultural Chemicals			4	
	Careers in Plant Science	1		1	
	Sub Total of Days	143		143	
Total Days for Class Work for the Year		180		180	
Days Set Aside for Individual Project Work		20		20	
Time Allotted for Test Review		6		6	
Time Allotted for Finals		6		6	
Time Allotted for Extras		5		5	
Total School Days Devoted to Instruction		143		143	

*Total Days Devoted to Major Instructional Area
**Space to be Used to Enter Estimate of Time for the Local Program

LEADERSHIP UNITS

UNITS

INTRODUCTION TO THE VO-AG PROGRAM

LEADERSHIP THROUGH FFA

LEADERSHIP DEVELOPMENT THROUGH THE USE OF PARLIAMENTARY PROCEDURE

LEADERSHIP SKILLS DEVELOPMENT

UNIT -- INTRODUCTION TO THE VO-AG PROGRAM

Upon completion of the Introduction to the Vo-Ag Program Unit, the student should be able to:

Define Vocational Agriculture.

List and explain how FFA and SOEP are integrated into a total Vo-Ag program.

Describe the functions of FFA in relation to the total Vo-Ag program.

Describe the functions of SOEP in relation to the Vo-Ag program.

List and identify the complete sequences and objectives of the entire Vo-Ag program.

List and explain the responsibilities of being a student in Vocational Agriculture.

Identify the major areas of instruction to be included in a total Vocational Agriculture program.

Identify and describe how Vo-Ag supports the agriculture in the community.

List reasons for both potential producers and agribusiness persons studying Vocational Agriculture.

Develop individual long-range goals for Vocational Agriculture programs.

Explain the importance of agriculture to the community, state and nation.

Describe the role of the Vo-Ag teacher in Vocational Agriculture.

Describe the role of the parent in Vocational Agriculture.

Discuss why Vocational Agriculture programs came into existence.

Give a brief history of Vo-Ag in the local community.

List ways in which Vocational Agriculture could help an individual reach their career goals.

REFERENCES

Local Vo-Ag Curriculum Guide

UNIT -- LEADERSHIP THROUGH FFA

Upon completion of the Leadership Through FFA Unit, the student should be able to:

Write a description of what you can do in FFA and how it relates to a career choice.

List, explain and/or recite the following FFA materials needed to become an FFA member:

a. a short history of the FFA
b. creed
c. motto
d. colors
e. emblem
f. kinds of membership
g. aims and purposes
h. the FFA salute
i. dress code
j. wearing the FFA jacket
k. code of ethics
l. receiving the greenhand degree

Describe how to have a good chapter including:

a. planning--key to good meetings
b. how to take part in chapter meetings
c. what constitutes a chapter program of activities

List and describe skills necessary to become a chapter leader.

List and describe FFA awards available to members including:

a. star degree awards
b. public speaking
c. achievement awards
d. proficiency awards
e. other state and local awards

Identify FFA contests available to members in Montana.

List the requirements for earning the Chapter Farmer, State Farmers and American Farmer Degree.

Explain how the local and state FFA program fits into the national organization.

LEADERSHIP THROUGH FFA (Continued)

REFERENCES

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia

Official FFA Manual

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia

UNIT -- LEADERSHIP DEVELOPMENT THROUGH THE USE OF PARLIAMENTARY PROCEDURE

Upon completion of this unit, the student should be able to:

Describe why parliamentary procedure improves a meeting.

Write the order of business for FFA meetings.

Identify and demonstrate the purpose and use of the gavel.

Identify and demonstrate the steps necessary to bring up and dispose of business properly.

Identify and list motions according to purpose and precedence.

Identify and list the characteristics of the kinds of motions used in conducting a meeting.

Identify and demonstrate the different types of voting procedures used in conducting a meeting.

Identify, explain, and demonstrate the procedures used in the Montana State FFA Parliamentary Procedure contest.

REFERENCES

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia

Workbook for Parliamentary Procedure

Vocational Instructional Services
EE Box 182
Texas A & M University
College Station, TX 77843

Roberts Rules of Order

William Morrow and Company, Inc.
105 Madison Avenue
New York, NY 10016

Montana FFA Contest Bulletin

OPI - Leonard Lombardi
Capitol Building
Helena, MT 59601

A Guide to Parliamentary Practices

Rucker
Interstate Printers and Publishers, Inc.
19-27 North Jackson Street
Danville, Illinois 61832

UNIT -- LEADERSHIP SKILLS DEVELOPMENT

Upon completion of the Leadership Skills Development Unit, the student should be able to:

Identify and demonstrate skills necessary to be an FFA officer.

Identify and demonstrate skills in meeting and/or introducing others.

Identify and demonstrate proper skills in presenting a good self-image to the public.

Identify and demonstrate communications skills using telephones, letters, memos, and verbal conversation.

Identify and demonstrate skills necessary to work on committees effectively and efficiently.

List and describe reasons why public speaking skills are important.

List types of speeches and explain how they are used.

Demonstrate public speaking abilities by selecting, researching, developing and delivering speeches.

Demonstrate the ability to lead a discussion group.

Demonstrate the ability to be a good listener.

REFERENCES

Instant Speaking Course, 1981

The Interstate Printers and Publishers, Inc.
19-27 North Jackson Street
Danville, Illinois 61832

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia

UNIT

AGRICULTURAL CAREER PLANNING

UNIT -- AGRICULTURAL CAREER PLANNING

Upon completion of the Agricultural Career Planning Unit, each student should be able to:

Draw three parts of a production-distribution cycle and write the approximate numbers of people employed in each.

Identify how agricultural career clusters fit into the work world in Montana and the nation.

Discuss the economic importance of agricultural jobs in relationship to the economy of Montana and the nation.

Discuss job outlooks; employment trends and general educational needs for the future in agriculture.

Identify the major career cluster areas in agriculture and agribusiness.

Distinguish between agribusiness careers and agricultural production careers.

Discuss the importance of setting career goals and objectives.

Complete a self-inventory and identify individual values, interests, aptitudes and abilities and personality traits in relationship to agricultural careers.

Identify the steps one should take in selecting a career in agriculture.

Select a major agriculture or agribusiness career choice and list the objectives and means of obtaining that goal.

Plan an SOE Program that supports the major career goal.

Plan your personal FFA program including offices, committees, awards and other activities which will support the major career goal.

Apply for and complete a social security form.

AGRICULTURAL CAREER PLANNING (Continued)

REFERENCES

Applied Biological and Agribusiness Interest Inventory (Aptitude Test)

The Interstate Printers and Publishers, Inc.
Jackson at Van Buren
Danville, Illinois 61832

Essential Aspects of Career Planning and Development

The Interstate Printers and Publishers, Inc.
Jackson at Van Buren
Danville, Illinois 61832

Your Introduction to Learning by Doing in Vocational Agriculture

The Interstate Printers and Publishers, Inc.
Jackson at Van Buren
Danville, Illinois 61832

Succeeding in the World of Work, Kimbrell, Vineyard

McKnight and McKnight Publishing Co.
Bloomington, Illinois

A New Look at Careers in Agriculture (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93409

Vocational Education in Agriculture--What? Why?

A.V.A.

Agri-Industry Careers

Teaching Unit Number 1 (probably outdated but usable if in Dept.)

Successful Farming Teaching Service

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM (SOEP)

UNITS

THE ROLE OF THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

TYPES OF SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS

PLANNING AND IMPLEMENTING THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

UNIT -- THE ROLE OF THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM (SOEP)

Upon completion of this unit, the student should be able to:

Define SOEP.

Describe the relationship between SOEP and the total program of vocational agriculture.

Identify and list the values of SOEP.

Identify and demonstrate those work skills and habits employers seek in their employees.

Describe how SOEP can help a person reach their long-range goals.

Describe how a person can get started in a SOEP.

Discuss how SOEP can lead to self-employment.

SELECTED REFERENCES

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

S.O.E. Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

Amberson and Anderson, Learning Through Experience in Agricultural Industry, McGraw Hill, New York, 1978.

UNIT -- TYPES OF SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS (SOEP)

Upon completion of this unit, the student should be able to:

Describe the types of SOEP.

Identify the component parts of each different type of SOEP.

List and describe the criteria to consider in selecting an appropriate type of SOEP.

Discuss how the major labor and wage laws affect students' employment in agricultural occupations.

Identify the major areas in which agricultural work experience may be planned and carried out.

Identify and select improvement projects for inclusion in the SOEP.

Identify and select supplementary skills for inclusion in the SOEP.

Identify opportunities for different types of SOEP.

Distinguish between ownership SOE's and placement SOE's.

Define improvement projects and supplementary agricultural skills.

Describe how to plan for the various types of SOE programs.

SELECTED REFERENCES

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

S.O.E. Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

Amberson and Anderson, Learning Through Experience in Agricultural Industry, McGraw Hill, New York, 1978.

UNIT -- PLANNING AND IMPLEMENTING THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM (SOEP)

Upon completion of this unit, the student should be able to:

Identify and discuss the purpose and characteristics of an SOE plan for an individual student.

Plan enterprises for SOE Programs.

List some of the sources for financing productive enterprises.

Identify the method of obtaining a loan from a credit source.

Keep all types of records needed by students for their SOEP.

Develop a long-range SOE plan.

Establish criteria for evaluating SOE Programs.

SELECTED REFERENCES

Student Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

S.O.E. Handbook

Future Farmers of America
National FFA Supply Service
P.O. Box 15159
Alexandria, Virginia 22309

Amberson and Anderson, Learning Through Experience in Agricultural Industry, McGraw Hill, New York, 1978.

AGRICULTURAL MECHANICS

UNITS

SHOP MANAGEMENT AND SAFETY

DRAWING AND SKETCHING IN AGRICULTURE MECHANICS

USE OF HAND TOOLS IN AGRICULTURAL MECHANICS

HARDWARE USED IN AGRICULTURAL MECHANICS

BASIC CARPENTRY AND CONSTRUCTION IN AGRICULTURE

HOT METAL AGRICULTURAL MECHANICS SKILLS

COLD METAL IN AGRICULTURAL MECHANICS

ARC WELDING IN AGRICULTURAL MECHANICS

OXYACETYLENE WELDING IN AGRICULTURAL MECHANICS

TRACTOR AND MACHINERY OPERATION AND SAFETY

BASIC ELECTRICITY IN AGRICULTURAL MECHANICS

SMALL GAS ENGINES IN AGRICULTURAL MECHANICS

CAREERS IN AGRICULTURAL MECHANICS

UNIT -- SHOP MANAGEMENT AND SAFETY

Upon completion of this Shop Management and Safety Unit, the student will be able to:

Demonstrate safe use of hand tools in the Ag Mechanics shop.

Demonstrate safe use of power tools in the Ag Mechanics shop.

Work in the Ag Mechanics shop in a safe manner.

Detect safety hazards in the shop and report them to the instructor.

List practices to keep a shop clean, organized and safe.

Describe the use and location of safety equipment such as safety glasses, first aid station, fire blanket, fire extinguishers, and fire exits.

Follow shop rules as outlined by the instructor.

Pass a comprehensive shop safety test with a 100% score.

Pass individual safety tests on the use of shop tools and equipment.

REFERENCES

Phipps, Mechanics in Agriculture, Interstate, 1977.

Developing Shop Safety Skills, AAVIM, 1981.

Power Tool Safety and Operation, Hobar Publications, 1973, with instructors packet.

Safety Exams, Hobar Publications

UNIT -- AGRICULTURAL MECHANICS DRAWING AND SKETCHING

Upon completion of this Drawing and Sketching Unit, the student will be able to:

List the reasons for a blueprint.

List the basic elements of a blueprint.

Properly draw the three views of an orthographic drawing.

Identify the common types of lines used in a blueprint.

Explain abbreviations used in drawing.

Use drawing equipment such as scale, compass, dividers, curves, T-square, scale rule, etc.

Draw simple three-view sketches of small objects using dimensions given by the instructor.

Calculate areas in square feet of the floor, walls, roof, windows, doors; cubic feet of footings, foundations, and building interior from a blueprint or construction plan.

Determine a bill of materials from a blueprint or construction plan.

Convert actual measures to commonly used scale measurement.

Demonstrate proper lettering.

Demonstrate proper dimensioning.

Calculate a bill of material from a sketch or drawing.

REFERENCES

Phipps, Mechanics in Agriculture, Interstate, 1977.

Walker, Exploring Drafting, Goodheart-Wilcox, 1978.

UNIT -- USE OF HAND TOOLS IN AGRICULTURAL MECHANICS

Upon completion of the Hand Tools Unit, the student should be able to:

Sharpen or repair the following shop hand tools:

a. metal and wood saws	f. wood chisels	k. axe
b. hammers	g. metal chisels	l. knives
c. drill bits	h. pliers	m. wrenches
d. planes	i. screwdrivers	n. squares
e. files	j. punches	o. tin snips

Identify the various hand tools used in agricultural mechanics.

Select grinding wheels of various grades and grains.

Select saw blades for various operatons.

Select sandpaper and sanding belts according to grit.

Test grinding wheels for flaws.

True a grinding wheel.

Install grinding wheels on grinders.

Install hack saw blades.

Demonstrate proper use of hand tools.

Properly clean and store tools

Fit hammer handles.

REFERENCES

Phipps, Mechanics in Agriculture, Interstate, 1977.

Shop Tools, John Deere Service Publications, 1973.

Shinn-Weston, Working in Agricultural Mechanics, McGraw Hill, 1978.

Tool Use, Conditioning, Materials, and Products, Agricultural and Industrial Education, Montana State University, 1976.

UNIT -- HARDWARE IN AGRICULTURAL MECHANICS

Upon completion of the Hardware Unit, the student should be able to:

Correctly identify hardware such as:

a. wood screws
b. bolts
c. metal screws
d. nails
e. washers
f. staples
g. chains
h. springs
i. bearings
j. hinges
k. rivets
l. pulleys
m. plumbing units
n. electrical units
o. braces
p. allen screws
q. keys
r. pipe fittings
s. copper fittings
t. other items

Describe where the various types of hardware items would be used.

Demonstrate the ability to order properly hardware items listed above.

REFERENCES

Hardware Identification Kit, Interstate.

Phipps, Mechanics in Agriculture, Interstate, 1977.

Fasteners, John Deere Service Publication, 1974.

UNIT -- BASIC CARPENTRY AND CONSTRUCTION

Upon completion of this Basic Carpentry and Construction Unit, the student will be able to:

Identify hand and power tools used in carpentry and construction.

Use layout and squaring tools.

Square a board and make a square cut to specifications with crosscut hand saw.

Identify common types of circular saw blades.

Square a board and make a square cut to specifications with portable circular saw.

Cut accurate holes with a hand brace and bits.

Select proper bits and drills for a given size.

Use hammers to scab and toenail.

Identify kinds of wood used in lumber.

Identify common yard lumber by type.

Identify common grades of lumber.

Prepare a bill of materials.

Calculate board feet, running feet and square feet.

Calculate cost of a given quantity of lumber based on standard pricing system.

Use wood screws to join wood.

Use screw mates or countersinks.

Construct a small project using wood.

Select paints, stains, varnishes, or other finishes for application.

Prepare surfaces to receive finish.

Apply finishes with a brush.

Clean, secure, and store equipment used in finishing.

Identify types of paint brushes.

List characteristics of a good paint brush.

BASIC CARPENTRY AND CONSTRUCTION (Continued)

Name the main components of paint.

Define terms associated with painting and finishing.

Evaluate the workmanship of a finished product.

Smooth material with the hand plane.

Drive and clinch nails properly.

Remove nails properly using proper hand tools.

Use a framing square to lay out angles.

Identify common building parts.

Layout common rafters.

Demonstrate the proper procedure for gluing wood.

Demonstrate the proper use of a table saw.

Demonstrate the proper use of the radial arm saw.

REFERENCES

Phipps, Mechanics in Agriculture, Interstate, 1977.

Resource Unit on Agricultural Construction, Agricultural and Industrial Education, Montana State University.

Midwest Plan Service Structures and Environment Handbook, Iowa State Univ. Extension Agricultural Engineer, 1980.

Wakeman, Modern Agricultural Mechanics, Interstate, 1977.

Capotosto, Basic Carpentry, Reston Publishing Co., 1980.

Hammond, Donnelly, Harrod, and Rayner, Woodworking Technology, McKnight Publishing Company, 1980.

UNIT -- HOT METAL AGRICULTURAL MECHANICS SKILLS

Upon completion of this Agricultural Mechanics Skills Unit, the student will be able to:

Identify the tools used in hot metal work.

Prepare metal for soldering.

Sweat copper tubing.

Cut copper tubing with a hand cutter.

Tin a soldering copper.

Solder tin and galvanized metal.

List components of solder.

Select proper solder for the job.

Identify tools used in laying out sheet metal.

Measure and mark sheet metal.

Cut sheet metal with tin snips.

Bend and shape sheet metal.

Construct small sheet metal projects.

Demonstrate the ability to properly heat metal.

Properly temper steel.

Properly anneal steel.

Properly harden steel.

Use the anvil for bending metal.

Solder electrical wires.

REFERENCES

Resource Unit on Agricultural Mechanics Skills, Agricultural and Industrial Education, Montana State University, 1976.

Wakeman, Modern Agricultural Mechanics, Interstate, 1977.

Phipps, Mechanics in Agriculture, Interstate, 1977.

UNIT -- COLD METAL IN AGRICULTURAL MECHANICS

Upon completion of the Cold Metal Unit, the student will be able to:

Identify tools used in cold metal work.

List ways of cutting cold metal.

Cut metal properly using a cold chisel.

Cut metal properly using a hack saw.

List steps used in bending cold metal.

Use the drill press properly to drill a hole in metal.

Use taps and dies to properly thread bolts and nuts.

Identify the classification of threads used on bolts.

Discuss bolt hardness classification.

Complete a small cold metal project.

Identify the different types of pipe.

Identify common pipe fittings.

List reasons for using threading compounds.

Describe how pipe and bolts are measured in order to determine diameter.

List the common sizes of steel pipe.

Distinguish between pipe and bolt threads.

Measure, cut, ream and thread metal pipe.

Describe the properties of metal to include: a) hardness, b) malleable, and c) ductile.

Distinguish between ferrous and non-ferrous metal.

Demonstrate correct use of files.

Attach metal with rivets.

COLD METAL IN AGRICULTURAL MECHANICS (Continued)

REFERENCES

Phipps, Mechanics in Agriculture, Interstate, 1977.

Shinn, Weston, Working in Agricultural Mechanics, McGraw Hill, 1978.

Wakeman, Modern Agricultural Mechanics, Interstate, 1977.

Blankenbaker, Modern Plumbing, Goodheart-Wilcox, 1978.

UNIT -- ARC WELDING IN AGRICULTURAL MECHANICS

Upon completion of this Arc Welding Unit, the student will be able to:

Define terms associated with arc welding.

List the kinds of arc welders and their characteristics.

Follow safety procedures when arc welding and pass arc welding safety test with 100% score.

List equipment and materials needed for arc welding.

List and describe the variables that determine weld quality.

Identify the meanings of the numbers in the AWS electrode classification.

Identify welding positions, weld joints and welding symbols.

List factors that determine welder current setting.

Identify characteristics of poor welds.

Select proper type and size of electrode for the job.

Label the parts of a weld.

Discuss characteristics of proper arc length.

Properly start, stop and restart and bead.

Prepare metal for welding.

Run a continuous bead.

Make a welding pad in the flat position.

Complete a V-butt weld in the flat position.

Complete a lap weld in the flat position.

Complete a fillet weld in the flat position.

Demonstrate safety with the arc welder.

Distinguish between AC and DC welding.

Discuss factors that determine current setting.

Prepare heavy metal for welding.

ARC WELDING IN AGRICUTLURAL MECHANICS (Continued)

Identify the various welding joints.

Identify the various welding positions.

REFERENCES

Resource Unit on Agricultural Welding, Agricultural and Industrial Ed.

Wakeman, Modern Agricultural Mechanics, Interstate, 1977.

Phipps, Mechanics in Agriculture, Interstate, 1977.

Giachino, Weeks, Johnson, Welding Technology, American Tech. Society, 1975.

Shinn, Weston, Working in Agricultural Mechanics, McGraw Hill, 1978.

UNIT -- OXYACETYLENE WELDING IN AGRICULTURAL MECHANICS

Upon completion of this Oxyacetylene Welding Unit, the student will be able to:

Demonstrate and pass a test with 100% on safety using oxyacetylene equipment.

Label parts of oxyacetylene equipment.

Define terms associated with oxyacetylene welding and cutting.

Identify and describe types of flames in oxyacetylene welding.

Properly turn on, list and adjust the flame.

Properly turn off the oxyacetylene equipment.

Define the terms flashback and backfire.

List causes of flashback and backfire.

Distinguish between brazing and fusion welding.

List advantages and disadvantages of brazing.

Prepare and clean the metal surface prior to welding.

List the purposes of flux.

Name the properties of a good weld.

Select proper tip size for welding.

Select the proper size and type of filler rod.

Properly make 90° cuts in mild steel.

Properly cut holes in mild steel.

Make a corner weld without filler rod.

Lay beads on a flat plate with or without filler rod.

Make a flat butt weld using a filler rod.

Construct a fillet weld in the flat position.

Construct a lap weld in the flat position.

Make a brazing butt weld joint.

Assemble and disassemble acetylene equipment properly.

OXYACETYLENE WELDING IN AGRICULTURAL MECHANICS (Continued)

Pass a safety test on the use of the acetylene welder.

Identify the various welding joints.

Identify the various welding positions.

Make a brazing lap weld joint.

Make a brazing fillet weld joint.

REFERENCES

Resource Unit on Agricultural Welding, Agriculture and Industrial Ed., Montana State University.

Shinn, Weston, Working in Agricultural Mechanics, McGraw Hill, 1978.

Phipps, Mechanics in Agriculture, Interstate, 1977.

Wakeman, Modern Agricultural Mechanics, Interstate, 1977.

Giachino, Weeks, Johnson, Welding Technology, American Technical Society, 1975.

UNIT -- TRACTOR AND MACHINERY OPERATION AND SAFETY

Upon completion of the Tractor and Machinery Operation and Safety Unit, the student will be able to:

Discuss importance of safety when operating tractors and machinery.

Recognize and understand the use of the SMV emblem.

Recognize the use of the instrument panel.

Discuss the importance of the operators manual.

Locate vital parts of a tractor.

Do a pre-operational safety check.

Check the crankcase oil level.

Service the air cleaner.

Check and service the cooling system.

Service the battery.

Service diesel fuel filter system.

List safety precautions to follow when refueling.

Properly start and stop a tractor engine.

Adjust the brakes for field or highway operation.

Check and service the tires and steering.

Properly start and stop tractor movement.

Use brakes for making turns.

Maneuver the tractor through a prescribed course.

Properly maneuver a tractor backward.

Name the safe methods of getting a tractor out of a mudhole.

List safety measures for operating a tractor on a highway.

Describe safety precautions to follow when hitching and unhitching equipment to a tractor.

Describe driving a tractor on rough ground, on sidehills and steep slopes.

TRACTOR AND MACHINERY OPERATION AND SAFETY (Continued)

Discuss safe use of a power take-off.

Describe matching gear selection and engine speed with load.

Discuss the importance of shields and guards on tractors and machinery.

Discuss the importance of ventilation to prevent carbon monoxide poisoning.

Discuss the importance of lubrication of farm equipment.

REFERENCES

Safe Operation of Agricultural Equipment, Hobar Publications.

Safe Tractor Operation and Daily Care, AAVIM, 1981.

UNIT -- BASIC ELECTRICITY IN AGRICULTURAL MECHANICS

Upon completion of the Basic Electricity Unit, the student will be able to:

Define electrical terms.

Discuss the electron theory.

List ways electricity is produced.

List safety practices associated with electricity.

Identify the uses of electrical energy.

Identify and describe the function of fuses.

Write a definition of Ohm's Law.

Use Ohm's Law to calculate amperage, voltage and resistance.

Calculate wattage and cost of electric power.

Read an electric meter.

Distinguish between a parallel and series circuit.

Identify electrical units.

Tie the underwriter's knot.

Wire an electrical plug.

Wire a light controlled by a single pole switch.

Wire a light controlled by two three-way switches.

Splice electrical wires and use solderless connectors.

Identify different types of electrical wire.

REFERENCES

Resource Unit on Agricultural Electricity, Agricultural and Ind. Ed., MSU 1976.

Understanding Electricity and Electrical Terms, AAVIM, 1981.

Maintaining the Lighting and Wiring System, AAVIM, 1980.

Mix, House Wiring Simplified, Goodheart-Wilcox, 1981.

UNIT -- SMALL GAS ENGINES IN AGRICULTURAL MECHANICS

Upon completion of the Small Gas Engine Unit, the student will be able to:

Define terms associated with small engines.

Identify the basic operating positions on small gas engines.

Distinguish between 2-stroke cycle engines and 4-stroke cycle engines.

List the four main events in the operation of a four-cycle engine.

List advantages of an air-cooled engine.

Test compression of a small gas engine.

Disassemble a small gas engine and clean parts.

Identify parts of a small gas engine.

Identify and use tools associated with small engines.

Use a micrometer.

Measure parts and compare with rejection sizes.

Use a torque wrench.

Order replacement parts for a small engine.

Reassemble a small gas engine.

Trouble-shoot a small gas engine.

Make adjustments for proper operation of a small gas engine.

Clean and service spark plugs on small engines.

Select proper lubricants for small engines.

REFERENCES

Repair Instructions, Briggs and Stratton Corp., Milwaukee, WI.

Roth, Small Gas Engines, Goodheart-Wilcox, 1975.

Crouse, Anglin, Small Engine Mechanics, McGraw Hill, 1980.

Air-Cooled Engine Mechanics Training Manual, Engine Service Association, Milwaukee, WI, 1974.

Power Shop Technical Manuals, Hobar Publications.

Maintenance and Repair of Small Engines, AAVIM, 1979.

UNIT -- CAREERS IN AGRICULTURAL MECHANICS

Upon completion of this Careers in Agricultural Mechanics Unit, the student will be able to:

List career opportunities in the local area in welding, small engines, electricity, building construction, tractor and equipment and metals.

List and describe career opportunities in sales and service associated with tools, hardware, and supplies.

List the competencies and requirements needed to enter specific careers in Ag Mechanics.

REFERENCES

Shinn,Weston, Working in Agricultural Mechanics, McGraw Hill, 1978.

Hoover, Handbook on Agricultural Occupations, Interstate, 1977.

ANIMAL SCIENCE

UNITS

INTRODUCTION TO ANIMAL SCIENCE

SELECTION OF LIVESTOCK FOR BREEDING AND FATTENING

CARE AND MANAGEMENT OF LIVESTOCK FOR BREEDING AND FATTENING

SELECTING LIVESTOCK FOR PRODUCTION PROJECTS

GENERAL ANIMAL NUTRITION

GENERAL ANIMAL HEALTH AND CARE

APPROVED PRACTICES FOR RAISING LIVESTOCK

UNIT -- INTRODUCTION TO ANIMAL SCIENCE

Upon completion of the Introduction to Animal Science Unit, the student should be able to:

Define terms associated with the livestock industry.

Explain the basic production--distribution cycle for livestock.

Name the five (5) primary classes of animals grown in Montana.

Determine the total numbers of beef, sheep, swine, dairy and horses in Montana.

List and discuss the job opportunities associated with the livestock industry.

Explain the importance of the livestock industry in the local community, state, and nation.

Explain the contribution of the livestock industry to the diet of humans.

Recognize trends in livestock production for local area, state, and nation.

Estimate the value of all livestock produced on home farm, county, state, and nation.

Describe the characteristics and origins of major breeds of beef cattle common to Montana.

Name the minor breeds of beef animals common to Montana.

Identify the characteristics and determine the origin of major breeds of sheep common to Montana.

Identify the characteristics and determine the origin of breeds of swine common to Montana.

Identify the characteristics and determine the origin of breeds of dairy cattle common to Montana.

Name two dual-purpose breeds of dairy cattle.

Identify the major parts of beef, sheep, swine and horses.

Identify the parts of a ruminant and non-ruminant digestive system.

Identify and explain the functions and parts of digestive systems.

Discuss the affect genetics has on the production potential of all farm animals.

INTRODUCTION TO ANIMAL SCIENCE (Continued)

List the functions of the male and female reproductive organs.

Draw or discuss the development of the fetus from time of conception until time of birth.

Discuss the importance of keeping livestock records.

Give an example of a management decision made on the basis of information or records.

Identify jobs and discuss career opportunities involved in the animal science industry.

Describe how the animal science industry is interrelated to and dependent upon agribusiness.

SELECTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), The Interstate Publisher, Danville, Illinois.

Stufflebeam, Charles E., Principles of Animal Agriculture, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1983.

UNIT -- SELECTION OF LIVESTOCK FOR BREEDING AND FATTENING

Upon completion of the Selection of Livestock for Breeding and Fattening Unit, the student should be able to:

Distinguish the animals which appear to have superior inheritance for selected traits as determined by evidence presented on the ancestors.

Determine those animals that are superior based on the evaluation of their past or present records of performance.

Distinguish those animals that are superior according to a combination of type, pedigree, and production testing selection procedures.

Identify FFA award areas and contests available in livestock selection.

Discuss the importance of heredity as it applies to selecting breeding mates.

Discuss the evaluation of progeny from various breeding systems.

List and identify terms associated with the breeding livestock industry.

Determine profit margins and breakeven prices for various species of livestock.

Distinguish those animals that are superior according to a phenotypic or type selection process as determined by market demands.

Identify wholesale and retail cuts of meat from the different animal species.

Describe carcass evaluation in relationship to selection of market animals.

List and explain terms associated with market animals.

Identify FFA contests and award areas available in market animal selection.

SELECTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), The Interstate Publisher, Danville, Illinois.

UNIT -- CARE AND MANAGEMENT OF LIVESTOCK FOR BREEDING AND FATTENING

Upon completion of the Care and Management of Livestock for Breeding and Fattening Unit, the student should be able to:

Identify approved practices for handling female breeding stock in Montana.

List the six major breeding systems and discuss their advantages and disadvantages to help a breeder select the appropriate system to meet his/her needs.

Describe the proper environment for and feeding of the female animal of various species during gestation.

Identify recommended breeding age and amount of service for male breeding animals of the various animal species.

For each species of animals, identify age of puberty, determine the estrus cycle and breeding cycle, and length of gestation.

Describe two signs of approaching parturition for each farm animal.

Discuss the advantages and disadvantages of artificial insemination in beef and dairy cattle.

Discuss the procedure and advantages of fertility and pregnancy testing.

List and explain the recommended practices to be used when handling newborn animals of various species.

List, diagram and/or describe proper handling facilities, shelters, housing, and use of feeding and watering equipment and systems.

Identify factors in sanitation and disease control and prevention associated with breeding animal enterprises.

Identify recommended methods to prevent livestock losses associated with breeding animal enterprises.

Describe the best way to raise orphan animals.

Demonstrate the ability to handle newborn animals and their mothers.

Describe the basic housing needed for various species of breeding livestock in Montana.

Determine adjusted weaning weight of cattle.

List and identify individual characteristics which will enable market animals to meet current demands in the livestock industry.

CARE AND MANAGEMENT OF LIVESTOCK FOR BREEDING AND FATTENING (Continued)

Identify, diagram, and/or describe facilities, equipment, housing and shelters associated with the market animal industry.

Identify and discuss methods to increase weight gains and feed efficiencies.

Identify the factors in animal sanitation and disease prevention and control associated with market animals.

Identify recommended methods to prevent livestock losses in handling and shipping.

Describe the precautions to take in handling livestock during transit.

List and explain terms associated with the market livestock industry.

Determine adjusted weaning weights.

Determine the efficiency of gain of livestock.

Determine dressing percentages of livestock.

Calculate shrinkage resulting from shipping and handling.

SELECTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), The Interstate Publisher, Danville, Illinois.

Stufflebeam, Charles E., Principles of Animal Agriculture, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1983.

UNIT -- SELECTING LIVESTOCK FOR PRODUCTION PROJECTS

Upon completion of the Selecting Livestock for Production Projects Unit, the student should be able to:

Recognize factors affecting the location of major livestock enterprises in the state and nation.

Select livestock enterprises for home farm.

Identify factors affecting enterprises selection for S.O.E.P.

Identify FFA proficiency award areas and complete proper forms and applications.

SUGGESTED REFERENCES

Amberson and Anderson, Learning Through Experience in Agricultural Industry, McGraw Hill, New York, 1978.

_____, Handbook for Supervised Occupational Experience, National FFA Supply Center, Alexandria, Virginia, 1982.

UNIT -- GENERAL ANIMAL FEEDING

Upon completion of the General Animal Feeding Unit, the student should be able to:

Compare and associate feed costs with the total cost involved in livestock production.

Discuss the four uses livestock make of their feed.

List and give examples of the three general classes of foodstuffs for livestock.

Discuss practices by which feed efficiency could be improved.

List the common classifications of feed nutrients.

Discuss the functions of carbohydrates, fats, protein, minerals, and vitamins and water in an animal's diet.

Explain the difference between roughages and concentrates.

List those factors that should be considered when determining the most economical feed.

List factors to be considered when formulating a ration.

Identify common sources of major feed nutrients.

Describe the various processes for preparing feed for livestock.

Discuss the storage and transportation of livestock feeds.

Identify those factors that must be considered when determining the most economical feed to feed.

Calculate the total cost of a livestock ration.

Identify those factors to consider when formulating a ration.

Balance a simple ration for livestock.

SUGGESTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Cullison, Arthur E., Feeds and Feeding, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Stufflebeam, Charles E., Principles of Animal Agriculture, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1983.

UNIT -- GENERAL ANIMAL HEALTH AND CARE

Upon completion of the General Animal Health and Care Unit, the student should be able to:

Identify the major disease-producing organisms.

List and describe both visual and non-visual indicators of animal health.

Name and suggest how to prevent and/or control infectious diseases of beef cattle, sheep, swine, dairy and horses common to Montana.

Name the three types of immunity and give examples of each.

Explain the quarantine procedure for livestock.

List the precautions to be taken in purchasing, selling and shipping disease-free animals.

Define the common terms related to animal health.

Develop a plan for maintaining animal health.

Name five signs of good animal health.

Name three signs of poor animal health.

List the average temperature range for livestock and poultry.

Discuss several factors that constitute a good sanitation program.

Identify and distinguish among the four kinds of injections.

Discuss two common diseases of each class of livestock and explain the symptoms, treatment and control of each disease.

Identify the agencies that monitor animal health.

List and describe the causes and characteristics of infectious and non-infectious diseases of animals in Montana.

SELECTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), The Interstate Publisher, Danville, Illinois.

Stufflebeam, Charles E., Principles of Animal Agriculture, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1983.

UNIT -- APPROVED PRACTICES FOR RAISING LIVESTOCK

Upon completion of the Approved Practices for Raising Livestock Unit, the student should be able to:

List, explain and demonstrate the common methods of branding, tatooing and ear-tagging appropriate to the different species of livestock.

List, explain and demonstrate the methods of dehorning, castrating, and docking appropriate to the different species of livestock.

List, explain and demonstrate the methods of clipping animals, and trimming feet of livestock.

List, explain and demonstrate the methods of vaccinating livestock.

Outline and demonstrate the proper procedure for training and preparing an animal for show.

Determine and record animal weights.

SELECTED REFERENCES

Blakely and Bade, The Science of Animal Husbandry, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), The Interstate Publisher, Danville, Illinois.

SPECIAL REFERENCES FOR ANIMAL SCIENCE

INTRODUCTION TO ANIMAL SCIENCE:

Books

Blakely, James and David H. Bade, The Science of Animal Husbandry, (2nd Ed), 1979, Reston Publishing Co., Inc., Reston Virginia. Prentice Hall Co.

Peterson-Christensen-Nelson, Working in Animal Science, 1978, Greg Division, McGraw Hill Book Company.

Ensminger, M. E., Animal Science, (7th Ed), 1977, The Interstate Printers and Publishers, Inc., Danville, Illinois.

Ensminger, M. E., The Stockman's Handbook, (5th Ed), 1978, The Interstate Printers and Publishers, Inc., Danville, Illinois.

Stufflebeam, Charles E., Principles of Animal Science, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1983.

Cullison, Arthur E., Feeds and Feeding, (2nd Ed), Reston Publishing Co., Inc., Reston, Virginia, 1979.

Higgs, Heidenreich, Loberger, Cropp and Mitchell, Agricultural Mathematics, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1981.

Amberson and Anderson, Learning Through Experience in Agricultural Industry, McGraw-Hill, New York, 1978.

_____, Handbook for Supervised Occupational Experience, National FFA Supply Center, Alexandria, Virginia, 1982.

Animal Science Resouce Unit, Introduction/Selection, Dec. 1975. Ag and Industrial Ed., MSU, Bozeman, MT (A complete list of references within.)

Basic Principles of Animal Science, 1976. A reference unit for teaching basic principles. Mississippi State University Research and Curriculum Unit, P.O. Drawer DX, Mississippi State, MS, 39762.

Filmstrips/Slides, Etc.

Pre-natal Development of the Calf (FS)

Vocational Education Productions
California State Polytechnic University
San Luis Obispo, CA 93407

Beef Breeds of North America (Poster)

Better Beef Business
P.O. Box 20205
Kansas City, MO 64195 Phone: (816) 431-2333

ANIMAL SCIENCE REFERENCES (Continued)

Purebred Operations (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

SELECTION OF BREEDING ANIMALS (In addition to references already stated)

Livestock: Judging, Selection and Evaluation, (2nd Ed), 1978, The Interstate Printers and Publishers, Inc., Danville, Illinois.

Ensminger, M. E., Horses and Horsemanship,(5th Ed), 1977, The Interstate Printers and Publishers, Inc., Danville, Illinois.

Other

Ewe and Lamb Management (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

Baby Pig Management (Slides)

Hobar Publications
1234 Tiller Lane
St. Paul, MN 55112

SELECTION OF MARKET ANIMALS (In addition to references already stated)

Romans and Ziegler, The Meat We Eat, (11th Ed), 1977,(References Only), The Interstate Printers and Publishers, Inc., Danville, Illinois.

Other

Lamb Carcass Evaluation (FS)

Beef Carcass Judging and Grading (FS)

Swine Carcass Evaluation (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

ANIMAL SCIENCE REFERENCES (Continued)

MANAGEMENT OF BREEDING ANIMALS (In addition to references already stated)

Juergenson, Elwood M., Handbook of Livestock Equipment, (2nd Ed), 1979, The Interstate Printers and Publishers, Inc., Danville, Illinois.

Other

Planning Fences (Reference Bulletin) 1980

AAVIM
Engineering Center
Athens, Georgia

Private Water Systems (Reference Bulletin) 1975

Midwest Plan Service

Sheep Handbook)
Beef Handbook)
Dairy Handbook) FS
Swine Handbook)
Planning Grain--Feed Handling)

Midwest Plan Service
122 Davidson Hall
ISU
Ames, Iowa 50011

Cow-Calf Production (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

The Brood Sow and Litter (FS)

Vocational Education Production
California Polytechnic State University
San Luis Obispo, CA 93407

MANAGEMENT OF MARKET ANIMALS (In addition to references already stated)

Feedlot Production (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

ANIMAL SCIENCE REFERENCES (Continued)

SELECTING LIVESTOCK FOR PRODUCTION PROJECTS (In addition to references already stated)

Chapter FFA Guide

National FFA Supply Service
Alexandria, Virginia

FFA Activities Handbook

National FFA Supply Service
Alexandria, Virginia

Other

Commercial Beef Cattle Projects (FS)

Fat Lamb Projects (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

GENERAL ANIMAL FEEDING (In addition to references already stated)

Cullison, Arthur E., Feeds and Feeding, (2nd Ed), 1979, Reston Publishing Co., Inc., A Prentice Hall Co., Reston, Virginia

GENERAL ANIMAL HEALTH AND CARE (In addition to references already stated)

The Brass Tacks of Animal Health, 1978, Doanes Publications.

Veterinary Guide for Farmers, 1975, Stamm, Hawthorne Books.

Other

Controlling Internal Parasites of Sheep (FS)

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

ANIMAL SCIENCE REFERENCES (Continued)

APPROVED PRACTICES FOR LIVESTOCK (Anything hereto already previously before mentioned)

	Other
Beef Cattle Castration	
Sheep Castration	
Docking Sheep	FS
Fitting and Showing Sheep	
Basic Sheep Handling Skills	

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, CA 93407

AGRICULTURAL BUSINESS

UNIT

AGRICULTURAL BUSINESS

AGRICULTURAL BUSINESS

Upon completion of the Agricultural Business Unit, the student will be able to:

Determine and discuss the importance of agriculture to the world, the U.S., to Montana, and to local areas.

Discuss the relationship of the producer to the various segments of Agribusiness.

Define the term Agribusiness.

List and discuss the major areas of Agricultural business.

Construct a list of occupations in the local area that are considered Agribusiness occupations.

Discuss what is meant by the free enterprise system.

List and describe the four major types of business organization.

Define and distinguish between sole proprietorship, partnership, corporation, cooperative.

List advantages and disadvantages of sole proprietorship, partnerships, corporations, cooperatives.

List and discuss responsibilities of the stockholders, directors, and managers of a corporation.

List and describe the responsibilities of the members, directors, and managers of a co-op.

REFERENCES

Weynat-Hoover-McClay, An Introduction to Agricultural Business and Industry, Interstate, 1971.

Introduction to AGRIBusiness, Dept. of Ag. Ed., North Dakota State Univ., 1980.

Understanding Your Cooperatives, U.S.D.A., Cooperative Information Report 6, 1979.

Doane's Farm Management Guide, Doane's Agricultural Service Inc., 1980.

PLANT SCIENCE

UNITS

PLANT GROWTH AND REPRODUCTION

BASIC SOILS

SOIL CONSERVATION AND EROSION CONTROL

SOIL FERTILITY AND FERTILIZERS

FIELD CROP MANAGEMENT

RANGE MANAGEMENT

BASIC HORTICULTURE

BASIC FORESTRY

CROP PEST MANAGEMENT

AGRICULTURAL CHEMICALS

CAREER OPPORTUNITIES IN PLANT SCIENCE

UNIT -- PLANT GROWTH AND REPRODUCTION

Upon completion of the Plant Growth and Reproduction Unit, the student should be able to:

Identify the major plant parts within the various vegetative and reproductive plant systems.

List the function(s) of the major plant parts within the various vegetative and reproductive plant systems.

Distinguish between monocotyledons and dicotyledons.

Distinguish between types of root systems.

Describe the ways by which plants propagate.

Describe environmental factors that affect seed germination.

Describe the photosynthesis process.

Describe the process of transpiration.

Describe the process of respiration.

Describe the process of osmosis.

Describe a plant's life cycle.

Define sexual and asexual reproduction.

Explain how plants are classified by life cycle to include: a) annual, b) biennial, and c) perennial.

Describe for four methods used to classify plants to include: a) similarity of function, b) life cycle, c) similarity of structure, and d) scientific classification.

Discuss why there is a need for a plant classification system.

Describe how growing takes place in a plant.

REFERENCES

Bishop, Carter, Chapman and Bennett, Crop Science and Food Production, McGraw-Hill Book Company,]983

Galston-Davies-Sotter, The Life of the Green Plant, Prentice Hall,]980.

Hartmann-Flocker-Kofranek, Plant Science Growth, Development and Utilization of Cultivated Plants, Prentice Hall,]981.

UNIT -- BASIC SOILS

Upon completion of the Basic Soils Unit, the students will be able to:

Describe the importance of soil to good crop production.

Define soil.

Describe soil management.

Describe the various factors that play an important part in the formation of soil.

Distinguish between chemical and physical weathering.

Describe the three basic components of soil: a) mineral component, b) organic component, and c) biotic component.

Describe and identify the three basic soil textures: a) sand, b) silt, and c) clay.

Distinguish between good soil structure and poor soil structure.

Describe the benefits of organic and inorganic matter in the soil.

Distinguish between organic and inorganic matter in the soil.

Determine the major soil textures using the "feel" method.

Identify and describe the major soil structures to include: a) platy, b) prismlike, and c) blocklike.

Define soil permeability.

Describe the conditions that affect soil permeability.

Name and describe the benefits of organic matter in maintaining soil conditions.

Describe the difference among soil horizons in a soil profile.

Define saline and sodic soils.

Discuss the effect of saline and sodic soils on soil management.

Define pH.

Read a soils map.

REFERENCES

Sopher-Baird, Soils and Soil Management, Reston Publishing Company, 1978.

Knuti-Korpi-Hide, Profitable Soil Management, Prentice Hall, 1962.

Soils, Ag and Industrial Education, Montana State University, 1975.

Bishop, Carter, Chapman, and Bennett, Crop Science and Food Production, McGraw Hill Book Company, 1983.

UNIT -- SOIL CONSERVATION AND EROSION CONTROL

Upon completion of the Soil Conservation and Erosion Control Unit, the student will be able to:

Define erosion.

List the two major types of erosion.

List the four types of water erosion.

List and describe conservation practices effective in reducing wind erosion.

List and describe conservation practices effective in reducing water erosion.

Match cropping systems to degree of erosion hazards.

List and describe the eight land capability classes according to proper land use.

Name the six factors used in determining the land capability class.

Select the best land class possible when given the major land class factors.

Select land use and treatments after determining land capability class.

Describe the various conservation systems to include: a) contour tillage, b) strip-cropping, and c) terracing.

Survey the community to identify specific examples of poor conservation practices.

REFERENCES

Bosworth-Foster, Approved Practices in Soil Conservation, Interstate Printers and Publishers, 1982.

U.S.D.A. Soil Conservation Service, Land Capability Classification, Agriculture Handbook #210.

Montana Land Judging Manual, Extension Service, Montana State University.

UNIT -- SOIL FERTILITY AND FERTILIZERS

Upon completion of the Soil Fertility and Fertilizers Unit, the student will be able to:

List the 16 mineral elements needed by plants to promote proper growth.

Define primary, secondary and micro plant nutrients.

List and classify the primary, secondary and micro plant nutrients.

List three functions of each primary plant nutrient.

List a function of each secondary plant nutrient.

Identify nutrient deficiency symptoms in growing crops.

Collect a soil sample and properly prepare it for testing.

Take soil test information and determine amounts of ferilizer to apply.

Define fertilizer.

Determine amounts of nutrients in a fertilizer using fertilizer formula.

Distinguish among the various types of fertilizers.

List and describe the methods of applying fertilizer.

Describe the importance of timing when applying fertilizer.

List safe practices in handling, applying, and storing fertilizers.

Determine the actual cost of a nutrient in 100 lbs of fertilizer.

Use the microcomputer to determine the best application level for fertilizer for a given crop yield.

Identify those factors that determine the use of fertilizer.

Distinguish among dry, liquid and gaseous fertilizers.

Explain why producers must fertilize their crops.

Calculate the amount of fertilizer to apply at given application rates.

SOIL FERTILITY AND FERTILIZERS (Continued)

REFERENCES

Jones, Fertilizers and Soil Fertility, Reston Publishing Company, 1979.

The Fertilizer Handbook, The Fertilizer Institute, 1015 Eighteenth Street, N.W., Washington, D.C., 1976.

Western Fertilizer Handbook, California Fertilizer Association, 1975.

Fertilizer Instructional Unit, Department of Agricultural and Industrial Education, Montana State University, 1980.

UNIT -- FIELD CROP MANAGEMENT

Upon completion of the Field Crop Management Unit, the student will be able to:

Identify the physical characteristics of a well-prepared seedbed.

Discuss the importance of timing cultural practices in seedbed preparation.

Describe the effects of too much or too little moisture on seedbed preparation.

Describe methods of seedbed preparation for various crops common to the area.

Determine optimum planting date, rate and depth of seeding crops common to the area.

List and describe methods of planting to include: a) surface planting, b) furrow planting, c) broadcast seeding, d) wheel-track planting, e) plow-plant planting, and f) ridge planting.

List reasons for cultivation.

List and describe irrigation methods common to the area.

List and describe harvesting methods appropriate for crops grown in Montana.

Discuss the importance of using high-quality certified seed.

Identify crop seed and plant samples

Describe tillage.

Identify and discuss the reasons for following good tillage practices.

Describe the steps one would follow in preparing for one or more of the common crops grown in the area.

Distinguish between primary and secondary tillage.

Describe the implements used for primary and secondary tillage.

Describe the function and advantage of various tillage implements commonly used in the area.

Discuss the proper management of crop residues.

Discuss the importance of moisture, oxygen and temperature in seedbed preparation.

FIELD CROP MANAGEMENT (Continued)

Define and describe the purposes of cultivation, minimum tillage, summerfallow and no till.

Identify factors that determine the importance of time and depth of cultivation.

Discuss the advantages and disadvantages of the various harvesting methods.

Distinguish among the humid and arid climates across the United States.

Determine the amount of moisture required to grow the various crops in your area.

Identify and describe the three main types of irrigation to include: a) surface, b) subsurface, and c) aerial.

Determine the importance of timing and frequency in irrigating crops.

Calibrate various types of seeders.

Calculate the number of acres in a parcel of land.

List the number of acres in the standard land areas.

Read a simple legal land description.

Calculate the yield of a crop per acre.

Calculate recommended seeding rates.

Calculate germination percentage.

REFERENCES

Boone-Richer-Wilson, Producing Field Crops, Interstate Printers and Publishers, 1981.

Bishop, Carter, Chapman, Bennett, Crop Science and Food Production, McGraw Hill, 1983.

Ware, Complete Guide to Pest Control, Thomson Publications, 1980.

Plant Production Management, Agricultural and Industrial Education, Montana State University.

UNIT -- RANGE MANAGEMENT

Upon completion of this Range Management Unit, the student will be able to:

Define range and range management

List factors affecting range plant growth.

Define an animal unit.

Define an animal unit month.

Classify range plants according to forage value.

Distinguish between cool and warm season plants.

Classify range plants according to grass-forb-shrub.

Distinguish between native and introduced plants.

Classify plants as decreaser, increaser, invader.

Identify common range plants of Montana.

Determine range condition and classify as excellent, good, fair, poor.

List approved practices in improving range condition.

Determine degree of utilization of range.

List problems associated with overgrazing.

List practices to prevent overgrazing.

Determine stocking rates and carrying capacities.

List methods of renovating rangeland.

List practices that will increase production of forage growth.

List methods of controling weeds and brush on rangeland.

List advantages of seeded pastures.

Identify poisonous plants common to Montana rangeland.

RANGE MANAGEMENT (Continued)

REFERENCES

Montana Rangeland Resource Program, Department of Natural Resources and Conservation, 1977.

Range Management Units 1, 2, 3, 4, 5, Montana Extension Service.

Range Management, Dept. of Agricultural and Industrial Education, 1976.

UNIT -- BASIC HORTICULTURE

Upon completion of the Basic Horticulture Unit, the student will be able to:

Write a definition of horticulture.

Explain the importance of horticulture as an industry.

Identify horticultural plants.

Classify horticultural plants as to life cycle.

Describe the importance of water on plant growth.

Define the effect that light quantity, quality, and duration has on plants.

Discuss the effect temperature has on plant growth.

List reasons for pruning a fruit tree.

List techniques of pruning trees.

Demonstrate types of asexual propagation of plants: cuttings, layerage, budding and grafting, and specialized structures.

Transplant a tree or shrub outdoors.

Repot a plant.

Describe the process of establishing a lawn.

List nutritional needs of lawns.

Control lawn weeds.

REFERENCES

Richardson-Moore, Working in Horticulture, McGraw Hill, 1980.

Nelson, Greenhouse Management, Interstate, 1980.

Hartmann-Kester, Plant Propagation, Prentice Hall, 1975.

Nelson, Greenhouse Operation and Management, Reston Publishing Co., 1981.

Half Acre-Barden, Horticulture, McGraw Hill, 1979.

UNIT -- BASIC FORESTRY

Upon completion of this Basic Forestry Unit, the student will be able to:

Define forestry and forest management.

Describe how trees grow.

List the parts of a tree and their function.

Discuss how trees reproduce.

Identify major tree species.

Explain harvesting and manufacturing forest products.

Discuss wood for energy.

REFERENCES

Anderson-Holland, Forests and Forestry, Interstate, 1982.

UNIT -- CROP PEST MANAGEMENT

Upon completion of the Crop Pest Management Unit, the students will be able to:

Describe how weeds cause economic loss.

Describe the methods of classification of weeds based upon growth characteristics.

Classify common weeds as to a) life cycle, b) type of leaf, c) growth habits, and d) method of propagation.

Describe the methods by which weeds are spread from place to place.

Distinguish between noxious, semi-noxious and common weeds.

Describe common cultural practices used in controling weeds.

Describe the biological pest control process.

Identify weeds, seeds and plants common in Montana.

Describe the function of an Integrated Pest Management (I.P.M.) system of pest management.

Identify ways in which insects cause crop loss.

Identify and describe the most common crop diseases in Montana.

Discuss the way in which crop disease causes crop loss in Montana.

Describe how chemicals control pests.

Describe the various types of insect life cycles.

Describe the physical characteristics of the common insects in Montana.

Distinguish between beneficial and harmful insects.

Describe how insects develop and multiply.

Identify the ways insects can spread from field to field.

Describe the feeding habits of insects.

Identify harmful insects common to Montana.

CROP PEST MANAGEMENT (Continued)

REFERENCES

Bishop, Carter, Chapman, Bennett, Crop Science and Food Production, McGraw-Hill, 1983.

Ware, George W., Complete Guide to Pest Control, Thomson Publications, Fresno, California, 1980.

Klingman, Glenn C. & Ashton, Floyd M., Weed Science Principles & Practices, John Wiley & Sons, New York, New York, 1983. (Teacher's Reference)

Metcalf, R. L. & Luckmann, W. H., (Ed) Introduction to Insect Pest Management, John Wiley & Sons, New York, New York, 1983. (Teacher's Reference)

UNIT -- AGRICULTURAL CHEMICALS

Upon completion of this Agricultural Chemicals Unit, the student will be able to:

Define the word "pest."

Classify pests into the main categories.

Identify common pests in the local area.

Select the chemical needed to fill a particular purpose.

Read a pesticide label and describe what it says.

Determine amount needed for specific jobs.

Describe the advantages and disadvantages of using various methods of applying chemicals.

Calibrate chemical application equipment.

Discuss importance of timing when applying chemicals.

Determine costs involved with chemicals.

Demonstrate safety procedures to follow in applying chemicals.

Demonstrate safety procedures when handling chemicals.

Demonstrate safety procedures when storing chemicals.

List safe methods of disposing of empty chemical containers.

Discuss federal and state regulations, and licensing which govern the sale and use of agricultural chemicals.

Discuss the obligation producers have when they are using chemicals to control pests.

Choose appropriate methods of applying pesticides.

Mix pesticides properly.

Describe the proper procedure for cleaning chemical applicators.

Determine amount of pesticide to apply per acre.

AGRICULTURAL CHEMICALS (Continued)

REFERENCES

Agricultural Chemicals, Agricultural and Industrial Education, Montana State University, 1975.

Ware, Complete Guide to Pest Control, Thompson Publications, 1980.

Pesticide Manual for Applicators and Dealers, Cooperative Extension Service, Montana State University.

Bishop, Carter, Chapman, Bennett, Crop Science and Food Production, McGraw Hill, 1983.

_____, Applying Pesticides: Management Application and Safety, American Association for Vocational Instructional Materials, Athens, GA.

UNIT -- CAREER OPPORTUNITIES IN PLANT SCIENCE

Upon completion of this Career Opportunities in Plant Science Unit, the student will be able to:

List career opportunities in the local area in soils and soil conservation, soil fertility areas.

List career opportunities in field crop management.

List career opportunities in range management, horticulture, forestry, and ag chemical industry.

Determine competencies and requirements for a specific job in interest area.

REFERENCES

Hoover, Handbook on Agricultural Occupations, Interstate, 1977.

Career Preparation in Agricultural Resources, U.S. Dept. of Education.

Richardson, Moore, Working in Horticulture, McGraw Hill, 1980.

Dana-Johnson, Forestry Education in America, Society of American Foresters, 1963.

Lee, Working in Agricultural Industry, McGraw Hill, 1978.

Curtis-Mercer, Exploring Occupations in Agribusiness and Natural Resources, McGraw Hill, 1976.

Farrington-Vaughn-Sartor-Brown, Fertilizers, Chemicals and Seed, McGraw Hill, 1980.

Career Preparation in Ornamental Horticulture, a Curriculum Guide for High School Vocational Agriculture, U.S. Dept. of Health, Educ. and Welfare, Office of Education, 1974.